Space Weather Forecast

Issued on Monday, 03 July 2023 at 13:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Radio Blackouts likely. Chance of S1/Minor radiation storm on 03 July.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been High with an X1 flare peaking at 02/2314 UTC from a large region in the northwest. This remains the largest and most complex region on the visible disc. The region has grown slightly through the period, and is retaining some magnetic complexity. Two regions close together in the southeast have both either grown slightly, or revealed additional spots. Both are showing signs of trying to develop some magnetic complexity. The other five regions on the disc are relatively small and stable at this time.
Despite the magnitude and drawn out X-ray signature of the flare from the northwest no Coronal Mass Ejection (CME) has been witnessed, and thus no Earth directed CMEs were observed in the period. .

Solar Wind / Geomagnetic Activity: The solar wind parameters indicate the waning weak connection to a coronal hole fast wind, with wind speeds declining from around 450 km/s to 380 km/s. The Interplanetary Magnetic Field was weak throughout, while the north-south component varied weakly. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is likely, with a slight chance of further Strong flares. The risk is mostly coming from the large sunspot in the northwest, but potentially also from the smaller sunspots in the southeast.

Solar Wind / Geomagnetic Activity: A CME associated with a Moderate-class flare on 29 Jun may include an Earth-directed component. Any glancing arrival at Earth would be expected on day 1 or early on day 2 (03/04 July), but it is considered more likely to miss. Solar winds are expected to be slow or slightly elevated through the period, with a slight enhancement possible from a small coronal hole on days 2 and 3 (04/05 July).
Geomagnetic activity is expected to be mostly Quiet to Unsettled, with only a slight chance of Active or Minor Geomagnetic Storm conditions on 03 or 04 July should we see any possible glancing CME impact or weak coronal hole high speed stream.

Energetic Particles / Solar Radiation: The solar radiation has a chance of reaching the S1/Minor Storm threshold on 03 July due to the recent Strong flare. Should this event not give a radiation storm, then there is a slight chance of S1/Minor storm levels being reached through the rest of the period.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	40
Very Active	R3 to R5 X	Yes	15	15	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	10	10	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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